

## SPINDLE FOR BRAIDING MACHINE

5 This invention relates to a spindle for braiding machine, which includes a spindle foot, a stem that threads a reel of thread, thread guides and tensors, a thread support-guide that slides on columns supporting a tube or capsule at the top end of which there is hinged a collapsible, raisable part that secures the top end of the reel, with said capsule housing a spring including an inner core that via a rod arranged head to head with said core, pushes said sliding thread support-guide, with an  
10 opening having been provided in said capsule that is large enough to introduce and remove said spring from said capsule therethrough.

## BACKGROUND TO THE INVENTION

15 The proposed invention provides an improvement to a spindle described in an existing utility model in the name of the same owner, TALLERS RATERA, S.A., under No. 9101469/7 for "IMPROVED SPINDLE FOR BRAIDING MACHINES".

The new spindle is contemplated as an improvement of some component parts of the one described in said prior utility model, which is the result of the  
20 experience and observations made over several years using the spindle in question.

In particular, the company TALLERES RATERA, S.A. has discovered that the system for removing the spring that charges the rod attached to said sliding thread support-guide was a complicated and delicate task, said spring-charged rod having to be released, by gripping it at one of its ends and removing it from a recess  
25 provided in the thread support-guide compressing said spring, in order to subsequently, by increasing the compression of the spring, move the rod towards the outside, finally removing the spring from its housing through the lower part of the capsule. In other words, this meant dismantling and/or handling various parts in order to remove said spring from inside its housing in the capsule.

30 Also, sometimes, with the previous arrangement there was also the risk of said spring "springing" because it was not retained properly in its seat.

Another aspect which has proved problematic concerns the cap-like upper nylon bush or reel head (or box), designated in said Utility Model No. 9101469 with reference number 29 and which is produced in three parts although no specific  
35 details of this are provided in said model. The use of said bush in the spindle mentioned in said prior utility model has shown wear and tear problems and has meant that the tasks for assembling and dismantling said cap were slightly slow.

Due to all this, the applicant has considered it necessary to improve said spindle providing a suitable solution to the mentioned problems.

## BRIEF DESCRIPTION OF THIS INVENTION

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This invention provides a development in the field of spindles for thread braiding machines, particularly in terms of their maintenance, reliability and decrease in production down times, by providing means that facilitate that the spindles are always in an optimum condition for fulfilling their purpose.

10 Therefore in view of the problems mentioned in the background to the invention, the improvements made to the spindle of this invention are basically focused on three points.

On the one hand, modifications have been made to the system for removing the spring that controls the upward and downward movement of said thread support-guide that slides on columns. In line with the solution proposed herein, it suffices to use a small die or punching element to remove the spring through a window suitably dimensioned for this purpose (which also enables the introduction of said spring), provided in the side wall of the housing of said spring inside the tube or capsule supported by said columns and that extends parallel to the stem and is separated therefrom.

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In this way said spring can be removed and positioned easily and quickly, reducing the necessary time (it has to be taken into account that the braiding machines generally have a large number of spindles) and also avoiding stoppages in the machinery because said spring has been positioned incorrectly.

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Also the upper nylon bush or reel head has been modified, and is now manufactured as a single part using treated steel which allows the operators to make quick changes and reduces the wear and tear of the whole ensemble (stem and axial element of the collapsible part that is introduced into the bush) and the bush proper.

Lastly (and although not shown in the drawings), it is envisaged to use bushings between the stem and the metallic spindle axis so that the device can be self-lubricated permanently by means of metallic particles, thus avoiding erosion.

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## BRIEF DESCRIPTION OF THE DRAWINGS

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In order to facilitate the explanation, this specification includes two sheets of drawings showing a non-limiting example of a practical embodiment of the scope of this invention.

- Figure 1 is an exploded view of this invention.
- Figure 2 is a detail of the spring mechanism seen from behind.

## SPECIFIC EMBODIMENT OF THE PATENT OF INVENTION UNDER APPLICATION

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So Figure 1 illustrates the body of the spindle with a general structure that coincides substantially with that described in said Utility Model No. 9101469/7 and comprising a foot 1, a stem 4 for threading a reel of thread, a bush 30, a base 31, a washer 33, a spindle disc 7 with pivots 9 (that couple with recesses in said disc 7), a  
10 reel 5 with a lower end 6 and a top end 10, a collapsible and raisable part 11 (for retaining the reel head), columns 13 along which a thread-guide 20 is moved in a sliding fashion, a tensing wire 21 that is drawn by said thread-guide 20 when it reaches the top end of its stroke and the lower end of which activates a toggled lever  
15 22 charged by a torsion spring 25, releasing the disk 7 (and allowing it to rotate) and a rod 18 against which there is arranged head to head an inner core 17 of a spring 16 housed inside a capsule 12 provided with an opening or window 28.

Furthermore, Figure 2 illustrates said capsule 12, the collapsible and raisable part 11 (in raised position), the columns 13, said rod 18 and an opening 32 through  
20 the inside of which the above-mentioned spring 16 can be seen that controls the up and down movement of the thread-guide 20.

As far as the operation of said spindle is concerned, this party refers to the explanation given in said Utility Model No. 9101469/7, since said operation has not varied except for the details indicated above that are explained below in greater  
25 detail.

So, said opening 32 made in the capsule 12, has a scale or passage that makes it possible to position said spring 16 inside said capsule 12 therethrough. To be precise, the operator can accompany this manoeuvre with a punching element (not shown) that will push said spring 16 downwards.

30 If it is necessary to remove said spring 16 from inside the capsule 12, simply with the afore-mentioned punching element it is easy to remove said spring 16 through the opening 32, saving a considerable amount of time and handling in comparison with Utility Model No. 9101469/7.

At the same time through said opening 32 the necessary lubrication of said  
35 spring 16 can be carried out, as in the prior model.

Also a washer 33 has been introduced that prevents the wear and tear of the discoidal plate 7 with the base 31, by lodging itself in between the two.

In each of the reel ends 10 and 6 a bushing has been introduced to prevent corrosion of the stem or axis 4 when the ensemble rotates.

Also the cap or reel head 34 has been made as a single part from treated steel, whereas previously, as indicated, it consisted of three parts, thus improving wear resistance.

All these improvements mean that said spindle has developed considerably and has improved the features of the utility model filed in 1991 by the same applicant.

After reading the explanation provided, it is noted that this patent of invention describes a new spindle for braiding machines and that the example mentioned herein is non-limiting. Therefore it can include different shapes of its component parts and/or adaptations, all within the scope of the following claims.